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Filing Date: 2/25/2002

Attorney Docket No. 100.255US01

Title: DISTRIBUTED AUTOMATIC GAIN CONTROL SYSTEM

REMARKS

Applicant has reviewed the Office Action mailed on October 12, 2005 as well as the art cited. Claims 1-36 are pending in this application.

Rejections Under 35 U.S.C. § 102

Claims 1-36 were rejected under 35 USC § 102(a) as being anticipated by Kintis et al., (U.S. Patent No. 6,535,720). Applicant respectfully traverses this rejection.

Claim 1:

Claim 1 is directed to a wireless distribution system. The wireless distribution system comprises a plurality of remote units distributed in a coverage area to receive wireless signals; a plurality of input ports to receive signals comprising the wireless signals provided by the plurality of remote units, a plurality of input power monitors operatively connected to one or more of the plurality of input ports to determine power levels of signals received at the input ports, a plurality of variable gain controllers to control the gain of signals received at the one or more of the plurality of input ports in response to a plurality of corresponding control signals, a node to combine a plurality of signals from the plurality of input ports, and a controller to provide the plurality of corresponding control signals to individually control each of the variable gain controllers.

The Examiner relied on Kintis in rejecting claim 1. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 1. Kintis does not teach or suggest, among other things, the claimed “plurality of *remote units* distributed in a coverage area *to receive wireless signals*.” In addition, Kintis does not teach or suggest the claimed “plurality of input ports to *receive signals comprising the wireless signals* provided by the plurality of remote units” and the “plurality of variable gain controllers to control the gain of *signals received* at the one or more of the plurality of input ports.” Kintis is absolutely silent on the processing of wireless signals received at a plurality of remote units distributed in a coverage

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area. Claim 1, therefore, is not anticipated by Kintis and Applicant requests that the rejection be withdrawn.

Claims 2 -11 depend directly or indirectly from claim 1 and, thus, are allowable at least for the reasons stated above with respect to claim 1. Applicant requests, therefore, that the Examiner withdraw the rejections.

Claim 12:

Claim 12 is directed to a method for controlling the signal levels of a wireless distribution system. The method comprises receiving wireless signals at a plurality of remote units distributed in a coverage area; providing signals from the remote units to a plurality of input ports; monitoring input power levels of the signals received at one or more of the plurality of input ports; combining signals from the plurality of input ports at a node; determining individual control signals for each of the input ports based on a weighting function that is proportional to the monitored input power levels such that the combined power does not exceed a predetermined level, and gain controlling the signals received at the input ports in response to the control signals.

In rejecting claim 12, the Examiner referred to arguments made with respect to claims 1-11. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 12. In particular, Kintis does not teach or suggest the claimed "receiving wireless signals at *a plurality of remote units distributed in a coverage area.*" In addition, Kintis does not teach or suggest the claimed "monitoring input power levels of *the signals received* at one or more of the plurality of input ports" and "gain controlling the *signals received at the input ports.*" Kintis is absolutely silent on the processing of wireless signals received at a plurality of remote units distributed in a coverage area. Claim 12, therefore, is not anticipated by Kintis and Applicant requests that the rejection be withdrawn.

Claims 13 depends directly from claim 12 and, thus, is allowable for at least the reasons stated above with respect to claim 12. Applicant, therefore, requests that the Examiner withdraw the rejection.

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Claim 14:

Claim 14 is directed to a method for controlling the signal levels of a wireless distribution system. The method comprises receiving wireless signals at a plurality of remote units distributed in a coverage area; providing signals from the remote units to a plurality of input ports; monitoring the input power level of the signals received at each of the input ports; controlling the gain of the signals received at each of the input ports in response to a control signal; combining the signals from the plurality of input ports at a node; monitoring power levels of the combined signals; determining weights for a weighting function that is proportional to power received at each input port, as determined by the input power monitors such that the power of the combined signals does not exceed a predetermined level; and providing the control signals to each input port based on the weighting function.

In rejecting claim 14, the Examiner referred to arguments made with respect to claims 1-11. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 14. In particular, Kintis does not teach or suggest the claimed "receiving wireless signals *at a plurality of remote units distributed in a coverage area.*" In addition, Kintis does not teach or suggest the claimed "monitoring the input power level of *the signals received* at each of the input ports" and "controlling the gain of *the signals received* at each of the input ports." Kintis is absolutely silent on the processing of wireless signals received at a plurality of remote units distributed in a coverage area. Claim 14, therefore, is not anticipated by Kintis and Applicant respectfully requests that the Examiner withdraw the rejection.

Claim 15:

Claim 15 is directed to a wireless distribution system. The wireless distribution comprises a plurality of remote units distributed in a coverage area to receive wireless signals and to provide the wireless signals through the distribution system to one or more input ports; a

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plurality of input power monitors operatively connected to the one or more input ports to determine power levels of the wireless signals received at the input port; and a plurality of variable gain controllers to control the gain of the wireless signals received at the one or more input ports based on a predetermined threshold wherein a saturation level is not reached.

In rejecting claim 15, the Examiner referred to arguments made with respect to claims 1-11. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 15. In particular, Kintis does not teach or suggest the claimed "*plurality of remote units* distributed in a coverage area to receive wireless signals and to provide the wireless signals through the distribution system to one or more input ports." In addition, Kintis does not teach or suggest the claimed "plurality of variable gain controllers to control the *gain of the wireless signals* received at the one or more input ports." Kintis is absolutely silent on the processing of wireless signals received at a plurality of remote units distributed in a coverage area. Claim 15, therefore, is not anticipated by Kintis and Applicant respectfully requests that the Examiner withdraw the rejection.

Claim 16:

Claim 16 is directed to a wireless distribution system. The wireless distribution system comprises a plurality of remote units distributed in a coverage area to receive wireless signals and to provide the wireless signals through the distribution system to one or more input ports; a plurality of input power monitors operatively connected to one or more of the input ports to determine power levels of the wireless signals received at the input ports; a plurality of variable gain controllers to control the gain of the wireless signals received at one or more of the input ports; a node to combine the wireless signals from the plurality of input ports; a combined power monitor to determine a power level of the signals combined at the node; and a controller to provide control signals to control one or more of the variable gain controllers so that an overflow condition does not occur at the node.

In rejecting claim 16, the Examiner referred to arguments made with respect to claims 1-11. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations

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of claim 16. In particular, Kintis does not teach or suggest the claimed "*plurality of remote units* distributed in a coverage area to receive wireless signals and to provide the wireless signals through the distribution system to one or more input ports." In addition, Kintis does not teach or suggest the claimed "*plurality of variable gain controllers to control the gain of the wireless signals* received at one or more of the input ports." Kintis is absolutely silent on the processing of wireless signals received at a plurality of remote units distributed in a coverage area. Claim 16, therefore, is not anticipated by Kintis and Applicant respectfully requests that the Examiner withdraw the rejection.

Claim 17 depends directly from claim 16 and, thus, is allowable for at least the reasons stated above with respect to claim 16. Applicant, therefore, requests that the Examiner withdraw the rejection.

Claim 18:

Claim 18 is directed to a method for controlling the signal levels of a wireless distribution system. The method comprises receiving a spectrum of wireless signals at a plurality of remote units distributed in a coverage area; digitizing the received signals; transmitting the digitized signals over one or more transmission links to a plurality of input ports operatively connected to a node where the signals are combined; monitoring input power levels of the signals received at one or more of the plurality of input ports; monitoring the combined power level of the signals combined at the node; determining individual control signals for controlling the signal levels of each of the input ports based on a weighting function that is proportional to the monitored input power levels such that the combined power as determined by the combined power monitor does not exceed a predetermined level, and attenuating the signals received at each of the input ports in response to the control signals.

In the office action dated 10/12/2005, the Examiner referred to claims 28-22 which Applicant has interpreted to mean claims 18-22. Based on that interpretation, the Examiner referred to arguments made with respect to claims 1-11 in rejecting claim 18. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 18.

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In particular, Kintis does not teach or suggest the claimed "receiving a spectrum of wireless signals *at a plurality of remote units* distributed in a coverage area" and "monitoring input power levels *of the signals received* at one or more of the plurality of input ports." Kintis is absolutely silent on the processing of wireless signals received at a plurality of remote units distributed in a coverage area. Claim 18, therefore, is not anticipated by Kintis and Applicant respectfully requests that the Examiner withdraw the rejection.

Claims 19-22 depend directly or indirectly from claim 18 and, thus, are allowable for at least the reasons stated above with respect to claim 18. Applicant, therefore, requests that the Examiner withdraw the rejections.

Claim 23:

Claim 23 is directed to a digital expansion unit. The digital expansion unit comprises a plurality of input ports to receive signals from a plurality of digital remote units distributed in a coverage area; a node to digitally combine signals from the input ports; a plurality of input power monitors operatively connected to one or more of the input ports to determine the level of signals received at the input ports, a plurality of gain controllers to adjust the gain of signals received at some or all of the input ports; a combined power monitor to determine the combined signal level of signals combined at the node; and a controller to provide control signals to control one or more of the gain controllers wherein an overflow condition is avoided for signals combined at the node.

In rejecting claim 23, the Examiner referred to arguments made with respect to claims 1-11. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 23. In particular, Kintis does not teach or suggest the claimed "a plurality of input ports to receive signals *from a plurality of digital remote units* distributed in a coverage area" and "a plurality of gain controllers to adjust the *gain of signals received* at some or all of the input ports." Kintis is absolutely silent on the processing of signals received from a plurality of digital remote units distributed in a coverage area. Claim 23, therefore, is not anticipated by Kintis and Applicant respectfully requests that the Examiner withdraw the rejection.

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Claim 24 is directed to a wireless distribution system. The wireless distribution system comprises one or more digital expansion units, the digital expansion units comprising: a plurality of input ports to receive signals from a plurality of digital remote units distributed in a coverage area; a node to digitally combine signals from the input ports; a plurality of input power monitors operatively connected to one or more of the input ports to determine the level of signals received at the input ports, a plurality of gain controllers to adjust the gain of signals received at some or all of the input ports; a combined power monitor to determine the combined signal level of signals combined at the node; and a controller to provide control signals to control one or more of the gain controllers wherein an overflow condition is avoided for signals combined at the node.

In rejecting claim 24, the Examiner referred to arguments made with respect to claims 1-11. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 24. In particular, Kintis does not teach or suggest the claimed "plurality of input ports to receive signals *from a plurality of digital remote units* distributed in a coverage area" and "a plurality of gain controllers to adjust the *gain of signals received* at some or all of the input ports." Kintis is absolutely silent on the processing of signals received from a plurality of digital remote units distributed in a coverage area. Claim 24, therefore, is not anticipated by Kintis and Applicant respectfully requests that the Examiner withdraw the rejection.

Claim 25:

Claim 25 is directed to a wireless distribution system. The wireless distribution system comprises a plurality of remote units distributed in a coverage area to receive wireless signals in the coverage area; a node to combine a plurality of wireless signals from one or more of the plurality of remote units; a power monitor to determine a power level of the wireless signals combined at the node; and a variable gain controller to control the gain of the signals combined at the node.

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In rejecting claim 25, the Examiner referred to arguments made with respect to claims 1-11. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 25. In particular, Kintis does not teach or suggest the claimed "plurality of remote units distributed in a coverage area to receive wireless signals in the coverage area" and "a node to combine *a plurality of wireless signals* from one or more of the plurality of remote units." Kintis is absolutely silent on the processing of wireless signals received at a plurality of remote units distributed in a coverage area. Claim 25, therefore, is not anticipated by Kintis and Applicant respectfully requests that the Examiner withdraw the rejection.

Claims 26-31 depend directly or indirectly from claim 25 and, thus, are allowable for at least the reasons stated above with respect to claim 25. Applicant, therefore, requests that the Examiner withdraw the rejections.

Claim 32:

Claim 32 is directed to a method for controlling the signal levels of a wireless distribution system. The method comprises receiving a spectrum of wireless signals at a plurality of remote units distributed in a coverage area; digitizing the received signals; transmitting the digitized signals over one or more transmission links to a node where the signals are combined; monitoring the power level of the combined signals at the node; and controlling the gain of the combined signals in response to the monitored power level.

In rejecting claim 32, the Examiner referred to arguments made with respect to claims 1-11. Applicant respectfully asserts that Kintis does not teach or suggest all the claimed limitations of claim 32. In particular, Kintis does not teach or suggest the claimed "receiving a spectrum of wireless signals at a plurality of remote units distributed in a coverage area" and "digitizing the received signals." Kintis is absolutely silent on the processing of wireless signals received at a plurality of remote units distributed in a coverage area. Claim 32, therefore, is not anticipated by Kintis and Applicant respectfully requests that the Examiner withdraw the rejection.

Claims 33-36 depend directly or indirectly from claim 32 and, thus, are allowable for at least the reasons stated above with respect to claim 32. Applicant, therefore, requests that the Examiner withdraw the rejections.

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Applicant respectfully submits that claims 1-36 are in condition for allowance and notification to that effect is earnestly requested. If necessary, please charge any additional fees or credit overpayments to Deposit Account No. 502432.

If the Examiner has any questions or concerns regarding this application, please contact the undersigned at 612-455-1685.

Respectfully submitted,

Date: February 13, 2006

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